ECS132

Weili Yin

HW3

A: $E(N|N \leq k) = 1 - (1-p)^{k+1}$

$E(N|N \leq 3) = 1 - (1-p)^{3+1} = .59$

Simulation:

```
sim1<- function(nreps,p, k){
  count = 0
  list<-rgeom(nreps,p)
  for (variable in list) {
    if(variable<=k)
      count <- count+1
  }
  return(count/nreps)
}
sim1(100000,.2,3)
```

```
> sim1(100000,.2,3)
[1] 0.58879
```

B: $cov(D,N) = E(DN) - E(D)E(N)$

$where\ E(D) = \sum_{i=1}^{11}(11-i)(1-p)^{i-1}p + \sum_{12}^{\infty}(i-11)(1-p)^{i-1}p = 6.56$

$E(ND) = \sum_{i=1}^{11} i(11-i)(1-p)^{i-1}p + \sum_{12}^{\infty} i(i-11)(1-p)^{i-1}p = 43.17$

$E(N) = \frac{1}{p} = 6.67, Thus\ Cov(D,N) = -.59$